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## ABSTRACT

The relationship between personalized computer-assisted instruction (CAI) and learning, attitude, and personality were examined. Subjects were 181 students, predominantly female, enrolled in a one-year teacher training course at McGill University. Treatments consisted of two versions of a series of ten CAI lessons, one written to appear highly personalized, the other non-personalized. Significant results were found in two areas: the group receiving the personalized version scored higher on exams and took longer to complete the course. No significant difference was found between the groups in attitudes towards CAI after the course, although both showed an increase in positive attitudes. On the 18 personality variables studied, only one (achievement via independence) was found to interact with treatment, and one (self-acceptance) with attitude toward CAI. Analysis of the findings suggests that personalization may make CAI appear less dehumanizing, and result in better learning. (Author/CMV)

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Personalized Computer-Assisted Instruction

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### Abstract

The relationships between personalized computer-assisted instruction (CAI) and learning, attitudes, and personality were examined. An experimental group took ten highly personalized CAI lessons while a control group took similar but non-personalized lessons. Students who experienced personalized CAI scored significantly higher than did control group subjects. No significant differences in attitude towards CAI were found between the two groups. The results suggest that personalization may make CAI appear less dehumanizing and result in significantly better learning.

## Personalized Computer-Assisted Instruction

One of the major advantages of computer-assisted instruction (CAI) and a reason for its growth during the last few years is its ability to individualize instruction (Stolurow, 1968; Suppes, 1969; Jerman, 1969). Critics of CAI, however, point to a major disadvantage: that of dehumanization. Deviations from the accepted patterns of classroom teaching, especially the notion that learning can occur in the absence of a human teacher are disturbing to some. As a result, CAI is often attacked for its lack of motivational influence, its failure to encourage creativity, and its absence of personal warmth.

Considering the problems of alienation, hostility and violence in today's conventional schools, which are brought about by their inability to deal with basic student concerns of identity, interrelationships, and personal power (Canfield, 1971), the criticism that CAI may be dehumanizing cannot be taken lightly. In spite of this, the idea has been advanced that it is the use to which technology is put, and not technology itself, which is dehumanizing (Gerard, 1967; Suppes, 1970; Goshen, 1971). In fact, technology can be a humanizing factor in education if used in the right way (Landers, 1971).

This study examines to what degree the technique of personalization can contribute to the individualization of CAI and at the same time act as a humanizing agent to minimize dehumanization and enhance learning.

Calling an individual by name is one way of personalizing communication. The stress laid on names in personal development courses such as Dale Carnegie is intuitive evidence of their value in business, education and politics. Salesman, teachers, and politicians alike often use first names to build confidence or rapport in an attempt to put people at ease, build self-esteem, or effect behavior change.

Suppes and Morningstar (1968) give anecdotal evidence that students at the elementary level often personalize the computer by perceiving it, not as a machine, but as a person to whom they direct their conversation.

It is interesting to note too, that in the past, most computer programmers who experimented with CAI usually felt the compunction to call each student by name, even though specific evidence as to possible beneficial effects was lacking. It was simply "cute".

One study by Schoen (1971) concluded that students who had their first names mentioned in feedback statements exhibited better attitudes towards CAI than did students for whom names were not used. Performance for both groups remained the same. Even today, most instructional computer programs usually have built into them the ability to call each student by name. There seems to be an inherent belief that this sort of personalization can at least facilitate if not enhance student learning. Indeed, since most good teachers are often described as warm, caring, personally involved individuals, it is little wonder that instructional

programmers attempted to have their computerized teaching systems emulate these attributes. Nevertheless there exists little evidence that such emulation has a significant effect on performance in CAI.

## Subjects

Subjects in the study were 27 males and 154 females with a mean age of 24.4 years. All were enrolled in a one-year teacher training course at McGill University, and all had at least an undergraduate degree.

## Procedure

A series of ten instructional programs was developed to teach the laws pertaining to education in the Province of Quebec. Nine of these were conventional CAI lessons. Each was followed by ten multiple-choice questions selected at random and based on the material in each lesson. Each student was required to reach a criterion level of 70% before proceeding to the next lesson in the series. Students could repeat the lessons and quizzes until the criterion was reached. The tenth session consisted of a criterion test of thirty multiple-choice items selected at random and based on the previous nine lessons.

Two complete versions of the programs were created. The first version was written to appear highly personalized. The second was a non-personalized version. The versions

differed only in the degree of personalization in each. Personalization was operationally defined in the following manner: first, each subject in the experimental group was called by his first or "candy" name throughout the course, while each subject in the control group was always called "student". Second, the experimental group was always greeted with a welcome such as "Good morning, John! It's nice to see you get such an early start." This was omitted for members of the control group, who were branched immediately to the lesson material. Third, the experimental group occasionally took part in short dialogues with the computer. These were unrelated to the course material and were omitted for the control group. Fourth, the computer referred to itself and the student using the personal pronouns "I" and "you" respectively. Subjects in the control groups however, were treated impersonally: no personal pronouns were used and the computer spoke in the impersonal third person. Fifth, feedback statements for the experimental group were personalized while the control group received only non-personalized confirmation of results. Each student was assigned randomly to either the experimental or the control group, and each took the ten lesson course independently including the criterion learning test during the last session. A number of paper-and-pencil tests of personality and attitude were administered, including the California Psychological Inventory (CPI), forms A and B of the Mathis, Smith and Hansen (1970)

version of the Brown (1966) attitude scale, and a biographical data questionnaire.

### Results

Performance scores showed that for each of the ten sessions, students in the personalized treatment scored higher than did those in the control group (see table 1).

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Insert table 1 about here  
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An analysis of variance with repeated measures indicated that students in the experimental group scored significantly higher than their control counterparts ( $F(179,1)=7.333$ ,  $p<.001$ ). No significant treatment by subject interaction was found. No significant difference was found between groups for scores on the criterion test.

Analysis of the elapsed time for each lesson (see table 2) indicated that students in the personalized group took significantly longer to complete the series of lessons than did the control group ( $F(179,1)=6.57$ ,  $p=.01$ ).

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Insert tab' 2 about here  
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An examination of the number of lesson attempts to reach criterion showed no significant difference between the two groups. A comparison of pretest and posttest attitude scores showed a significant increase in positive attitude



toward CAI for both groups ( $t=3.6$ ,  $p=.001$ ). No significant difference was found between groups in posttest attitude scores. Other analyses indicated no significant interaction between attitude toward CAI and learning scores.

Of the eighteen personality variables included in the CPI, only one (achievement via independence - Ai) was found to interact with the treatment ( $p=.025$ ). Similarly, only one personality variable (self-acceptance - Sa) was found to interact significantly with attitude towards CAI ( $p<.04$ ).

### Discussion

The results of the study indicate that throughout the course individuals who experienced personalized CAI achieved significantly higher learning scores than did students in the control treatment. However, no significant difference was found between groups on the final criterion test. One reason for this may be that students studied the computer lesson printouts in order to achieve the final criterion and pass the course. Such make-up study would tend to mask any differences which emerged during the course.

The personalized course took significantly longer to complete than did the non-personalized course, though the reason for this is not immediately clear. The use of student names would not appear to increase the time significantly in this study, since subjects in the non-personalized treatment were called "student" with the same frequency. The inclusion of short dialogues and humor

would be expected to take somewhat longer for the computer to output (especially when using slow teleprinters) and for the student to read. However, it is doubtful that this alone would account for the significantly longer time. One explanation might be that students in the personalized treatment felt more comfortable and lingered over frames longer to absorb this highly personalized treatment. However this explanation was not supported by any significant increase in attitude towards CAI by the personalized group compared with the non-personalized group. The finding that attitudes toward CAI were significantly increased due to exposure to CAI confirms the results of a number of previous studies.

While there is no single answer to improving instruction, it may be that the threat of depersonalization can be reduced by the introduction of personalized programs with resultant increases in learning.

Note

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This study is a revised summary of the work by Kolano (1975).

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TABLE 1

MEANS AND VARIANCES OF INDIVIDUAL LEARNING  
SCORES FOR EACH OF TEN SESSIONS FOR  
BOTH TREATMENT GROUPS

Session	Personalized		Non-personalized	
	Mean	Variance	Mean	Variance
Lesson 1	70.80	322.22	69.53	261.17
Lesson 2	82.23	143.83	82.05	121.57
Lesson 3	85.53	126.56	81.89	181.33
Lesson 4	74.34	180.34	72.23	163.01
Lesson 5	75.48	217.53	73.82	206.12
Lesson 6	84.97	130.78	80.88	146.70
Lesson 7	92.88	78.69	90.17	80.83
Lesson 8	91.54	61.88	91.05	72.40
Lesson 9	89.86	95.34	87.78	84.98
Quiz	78.27	161.05	75.72	129.49
N = 93		N = 88		

TABLE 2

MEANS AND VARIANCES OF THE ELAPSED TIME FOR EACH  
OF THE TEN SESSIONS FOR BOTH TREATMENT GROUPS

Session	Treatment			
	Personalized		Non-personalized	
	Mean	Variance	Mean*	Variance
Lesson 1	63.34	222.45	57.79	202.93
Lesson 2	54.32	48.20	45.77	36.88
Lesson 3	37.68	34.85**	37.41	73.63**
Lesson 4	39.31	68.00	37.61	80.77
Lesson 5	62.17	120.11	58.79	90.48
Lesson 6	41.05	44.30**	41.87	145.12**
Lesson 7	22.54	18.36	20.99	22.71
Lesson 8	36.26	32.23	34.63	39.84
Lesson 9	59.43	58.71	52.85	62.13
Quiz	41.70	292.14	40.70	270.53

N = 93

N = 88

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\*All measures of time in minutes

\*\* F test for difference between variances significant,  $p < .001$ .